

Claims

1. A method comprising:

providing a variable bit rate (VBR) representation
5 of an image sequence, the VBR representation comprising
a plurality of blocks of information;

determining a plurality of time intervals T_p
within the VBR representation in which a number of
blocks of information per unit time is greater than a
10 baseline value;

determining a plurality of time intervals T_n
within the VBR representation in which a number of
blocks of information per unit time is less than the
baseline value; and

15 creating a second representation of the image
sequence in which some blocks of information B_p are
removed from the time intervals T_p and interlaced with
blocks of information B_n in the time intervals T_n to
reduce a variation in a number of blocks of information
20 per unit time between the time intervals T_p and T_n .

2. The method of claim 1 wherein the number of
blocks of information per unit time in the second
representation is about equal to the baseline value in
25 the time intervals T_p and T_n .

3. The method of claim 1 further comprising:

determining a bit rate for encoding the image
sequence to the VBR representation which produces a
30 desired information content of the second
representation and constrains a maximum bit rate of the

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second representation to be less than or equal to a predetermined value.

4. The method of claim 1 further comprising:
5 determining a bit rate for encoding the image
sequence to the VBR representation which substantially
maximizes a desired information content of the second
representation and constrains a maximum bit rate of the
second representation to be less than or equal to a
10 predetermined value.

5. The method of claim 1 further comprising:
populating a header in the second representation
with data indicating the time intervals T_n .

15 6. The method of claim 1 further comprising:
streaming the second representation of the image
sequence via a communication network;
receiving the second representation of the image
20 sequence via the communication network; and
reconstructing frames of the image sequence
concurrently with said receiving, said reconstructing
comprising:

25 during the time intervals T_n , reconstructing
frames of the image sequence based on blocks of
information B_n received about in real time, and
storing the blocks of information B_p in a buffer;
and

30 during the time intervals T_p , reconstructing
frames of the image sequence based on the blocks
of information B_p stored in the buffer and blocks

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of information received about in real time.

7. A method of reconstructing an image sequence originally encoded in a variable bit rate (VBR)

5 representation, the VBR representation comprising a plurality of blocks of information, the VBR representation defining a plurality of time intervals T_p in which a number of blocks of information per unit time is greater than a baseline value and a plurality
10 of time intervals T_n in which a number of blocks of information per unit time is less than the baseline value, the method comprising:

receiving a second representation of the image sequence in which some blocks of information B_p are
15 removed from the time intervals T_p and interlaced with blocks of information B_n in the time intervals T_n to reduce a variation in a number of blocks of information per unit time between the time intervals T_p and T_n ; and

reconstructing frames of the image sequence
20 concurrently with said receiving, said reconstructing comprising:

during the time intervals T_n , reconstructing frames of the image sequence based on blocks of information B_n received about in real time, and
25 storing the blocks of information B_p in a buffer; and

during the time intervals T_p , reconstructing frames of the image sequence based on the blocks of information B_p stored in the buffer and blocks
30 of information received about in real time.

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8. The method of claim 7 wherein the number of blocks of information per unit time in the second representation is about equal to the baseline value in the time intervals T_p and T_n .

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9. The method of claim 7 wherein the second representation comprises a header with data indicating the time intervals T_n , the method further comprising extracting the data indicating the time intervals T_n from the header, wherein said reconstructing the frames is based on the data indicating the time intervals T_n .

10. A system comprising:
an encoder to provide a variable bit rate (VBR) representation of an image sequence, the VBR representation comprising a plurality of blocks of information; and
a processor to determine a plurality of time intervals T_p within the VBR representation in which a number of blocks of information per unit time is greater than a baseline value, to determine a plurality of time intervals T_n within the VBR representation in which a number of blocks of information per unit time is less than the baseline value, and to create a second representation of the image sequence in which some blocks of information B_p are removed from the time intervals T_p and interlaced with blocks of information B_n in the time intervals T_n to reduce a variation in a number of blocks of information per unit time between the time intervals T_p and T_n .

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11. The system of claim 10 wherein the number of blocks of information per unit time in the second representation is about equal to the baseline value in the time intervals T_p and T_n .

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12. The system of claim 10 wherein the processor is further to determine a bit rate for encoding the image sequence to the VBR representation which produces a desired information content of the second

10 representation and constrains a maximum bit rate of the second representation to be less than or equal to a predetermined value.

13. The system of claim 10 wherein the processor
15 is further to determine a bit rate for encoding the image sequence to the VBR representation which substantially maximizes a desired information content of the second representation and constrains a maximum bit rate of the second representation to be less than
20 or equal to a predetermined value.

14. The system of claim 10 wherein the processor is to populate a header in the second representation with data indicating the time intervals T_n .

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15. The system of claim 10 further comprising a transmitter to stream the second representation of the image sequence via a communication network.

30 16. The system of claim 15 further comprising:
a receiver to receive the second representation of

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the image sequence via the communication network;

a buffer; and

a second processor responsive to the receiver to
reconstruct frames of the image sequence concurrently
5 with the second representation being received;

wherein during the time intervals T_n , the second
processor is to reconstruct frames of the image
sequence based on blocks of information B_n received
about in real time, and to store the blocks of
10 information B_p in the buffer; and

wherein during the time intervals T_p , the second
processor is to reconstruct frames of the image
sequence based on the blocks of information B_p stored
in the buffer and blocks of information received about
15 in real time.

17. A system for reconstructing an image sequence
originally encoded in a variable bit rate (VBR)
representation, the VBR representation comprising a
20 plurality of blocks of information, the VBR
representation defining a plurality of time intervals
 T_p in which a number of blocks of information per unit
time is greater than a baseline value and a plurality
of time intervals T_n in which a number of blocks of
25 information per unit time is less than the baseline
value, the system comprising:

a receiver to receive the second representation of
the image sequence via the communication network;

a buffer; and

30 a processor responsive to the receiver to
reconstruct frames of the image sequence concurrently

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with the second representation being received;

wherein during the time intervals T_n , the processor is to reconstruct frames of the image sequence based on blocks of information B_n received

5 about in real time, and to store the blocks of information B_p in the buffer; and

wherein during the time intervals T_p , the processor is to reconstruct frames of the image sequence based on the blocks of information B_p stored
10 in the buffer and blocks of information received about in real time.

18. The system of claim 17 wherein the number of blocks of information per unit time in the second
15 representation is about equal to the baseline value in the time intervals T_p and T_n .

19. The system of claim 17 wherein the second representation comprises a header with data indicating
20 the time intervals T_n , wherein the processor is further to extract the data indicating the time intervals T_n from the header, and to reconstruct the frames based on the data indicating the time intervals T_n .

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